

**Abstract**

The invention describes a low temperature method for producing multi-layered or multi-phased coatings. With the technique according to the present invention, surface coatings with controlled variations in terms of chemical composition, phase composition, porosity, surface roughness, mechanical properties, biocompatibility, etc can be achieved. The method of coating a substrate surface comprising the steps of preparing one powder mixture, or several powder mixtures having different chemical composition, wherein at least one of said powder mixtures comprise a non-hydrated hydraulic ceramic powder binder phase, pre-treating a substrate surface, to increase the adhesion between the substrate and the ceramic coating, applying one or more different layers on top of each other of the non-hydrated powder mixture on the substrate, and finally, hydrating the powder layer/layers in a curing agent containing ions of carbonates, phosphates or fluorides.